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Institutional bricolage as a new perspective to analyse institutions of communal irrigation: Implications towards meeting the water needs of the poor communities in rural Ethiopia

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ABSTRACT

Access to water supply in Ethiopia is one of the lowest in the world. In response, Ethiopia has developed a 15-year water development project for the period 2002-2016 in order to enhance appropriate and comprehensive water use policies and related institutional arrangements. The objective of this paper is to analyze the institutional aspects of communal irrigation in Ethiopia using the concepts of institutional bricolage. Based on two case studies and intensive literature review, the trust to ensure that the poor communities achieve economic efficiency, social equity in access to water and ecological sustainability simultaneously through the adoption of 'institutional crafting' does not seem to correspond with reality. It then challenges the universal application of the 'design principles' approach for its inadequacy in explaining the realities underlying the institutional formation of communal irrigation where collective action is more complex. The paper argues that the concept of institutional bricolage is an alternative approach to understand the dynamics and complexities of institutions in irrigation development. In the face of growing demands of irrigation water, there are key issues to consider through the lens of bricolage for appropriate development interventions aimed at institutional building: acknowledging the complexity of institutional building, ecological stress, historical factors, power relations, gender, access to other institutions and cultural repertoires embedded in the community. Development interventions which recognise the importance of the processes of institutional bricolage have great potential of success and enhance sustainable use of natural resources.

Keywords: institutional bricolage, institutional crafting, irrigation, Ethiopia

1. INTRODUCTION

Access to water supply in Ethiopia is one of the lowest in the world (World Bank, 2006). According to the World Bank , in 2008, only 38% of the population have access to improved water (World Bank, 2010). In 2006 the Bank conducted a study to estimate the magnitude of the impacts of high water variability on growth and poverty. The study finds that the effects of water variability reduced projected rates of economic growth by 38% per year and increased projected poverty rates by 25% over a twelve year period. In response, Ethiopia has developed a 15-year water development project for the period 2002-2016 in order to enhance the appropriate and comprehensive water use policies and related institutional arrangements. Among the water sectors agricultural water use has got the most attention through the strategy called Agricultural Development Led Industrialization (ADLI). The intervention of the plan is to address most of the supply-demand gap within 15 years time through increasing the number of large, medium and small scale irrigation schemes in rural areas where 80 % of the population live (World Bank, 2010). In addition, the Government recognizes, community managed small-scale irrigation water schemes as viable alternative to privatization and state ownership of the resource (Water Sector Development Program of MoWR, 2003). This is expected to increase the role of local communities in resource management.

Locally, there are different institutional arrangements for irrigation water management; examples include use of "water masters" and executives of water users' associations. Establishing appropriate water management institutions and strengthening capacity of water management organizations is expected to bring efficient and equitable distribution of irrigation water for beneficiaries, thus contributing to increased productivity (Ostrom, 1990; 1992; WSDP, 2003; World Bank, 2003; 2004). However, most of these resources are exploited on a first come, first-served basis which results in the inefficient utilization of the resources and inequalities

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in the distribution of benefits to users (Gebremedhin et al., 2002). This implies that just establishing the institutional set-up for the resource management is not a sufficient condition for sustainable use of the resources. Relatively complex legal and administrative systems are needed in water allocation and effectiveness in internal governance is needed for the effective application of community rules (Cleaver, 2002; Cleaver and Hamada, 2010). Therefore, the need to identify factors that facilitate or hinder the development and effectiveness of local formal and informal institutions becomes important.

The general objective of this paper is to analyze the institutional aspects of communal irrigation in Ethiopia using the concepts of institutional bricolage that helps to grasp relevant learning's about the nature and roles of institutions in irrigation water management and factors determining collective action of irrigation management. This is important for two reasons. Firstly, to improve the water needs of the poor communities and secondly, to identify recommendations according to the kind of interventions in the Ethiopian context. The argument that will be developed in this paper is that, in order to analyze institutions of communal irrigation, an innovative analytical approach has to be used. At the core of this new approach is the adoption of the concepts of Institutional bricolage. It builds on the argument that ' institutional building should be based on socially informed analysis of the content and effects of institutional arrangements rather than on their form alone' (Cleaver, 2002: 11).

In order to achieve the stated objective the present paper will be divided in four main sections. In the first section, I will review literature on theories of collective action in relation to natural resource management that will frame my study. In the second section, I will continue with presenting and discussing some of the selected empirical studies conducted on small-scale irrigation in Ethiopia. In the third section, I will present case studies which will help me in the institutional analysis of communal irrigation using the theoretical framework presented before followed by critical reflection. Finally, I will conclude by resuming the main findings and their possible implications.

2. Theoretical framework

2.1. Theorizing institutions

From a vast body of literature, it is possible to find that there are three main theories of natural resource management, namely: the tragedy of the commons, community based natural resource management and institutional bricolage which this paper adopts. The last two are bottom-up approach. In each of the theories, views on the role and nature of institutions are different. Before discussing the overview of the institutional theories, I will first give a description of the commonly existing definitions of institutions in relation to natural resource management, then focus on the theory of institutional bricolage as the main theoretical framework on which my study bases.

The concepts of institutions have multiple interpretations. Scholars have often used the term in a causal manner and refer to a great variety of things. What is common and clear in literature is that the meaning and how they are defined depends much on the school of thought to which one belongs (Ostrom, 2006; Cleaver, 2006). All these definitions perceive institutions as structures likely to impact on the behaviour of individuals or groups of individuals. One of the most commonly known definitions of institutions is the 'rules of the game' (North, 1990). Rules are a common aspect of definitions of institutions and ' institutions' used in this paper include both formal and informal. In explaining the significance of the institutions Cleaver states *' institutions matter then because they shape individual and collective behaviour and the pattern of access to resources. They are the channels through which peoples livelihoods are mediated'* (Cleaver, 2006: 2). If one sees carefully most of the definitions given, one can understand that much attention is given to the formal role of institutions. Formal rules are not, however, the only stabilizing influence on human behaviour. Even if rules often relate to formalized, written-down regulations, there are also structuring influences on behaviour. For instance, Ostrom and Cleaver, recognized the equal importance and significant role of norms and beliefs even though both are different in the perception and meaning given to the informal rules and norms. It is also important to note here that institutions are different from organizations. They are different in the sense that organizations constitute groups of people with common purpose to achieve objectives and institutions create the framework up on which these organizations are based (Fabricius, 2004). In short, institutions are the rules, norms, and beliefs of the game where as organizations are the players of the game. With this basic definitions, I will turn to briefly describe the main scientific perspectives on institutions and institutional processes divided based on periods of dominancy and thinking -traditional institutional perspectives, new institutionalism, and post-institutionalism (Lowndes, 2002).

The traditional institutional perspectives which is also called old institutionalism was dominant in the periods of 1960 and 70's ; and focused on the formal institutions and in particular on the functioning of the state, laws, and regulations (Lowndes, 2002). The basic belief was that institutions were able to determine the behaviour of individuals simply through their functioning. One of the first respected authors to contribute to insights into the institutional theories in the context of natural resource management is Garret Hardin with his article ' The Tragedy of the Commons' which is published in 1968.

Hardin (1968: 1244) in his famous work of the tragedy of the commons states that ' as a rational being, each herdsman seeks to maximize his gain. ...to add another animal to his herd ....therein is the tragedy. Each man is locked into a system that compels him to increase his herd without limited.....freedom in a commons bring ruin to all'. He criticized common property as he regard it as a free access system in which no individual was responsible. According to him voluntary collective action is not possible or slim because of the selfish nature of individuals in seek of their maximization of their individual benefits and existence of free riding. In addition, the size of the population makes the enforcement of collective

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action difficult. The solution according to this school of thought is twofold: privatization or state regulation.

In reaction to Hardin's view, the new institutional perspectives (CBNRM) argue that there is a need to emphasize the social, normative or rational character of institutions rather than focusing on the formal political aspects. This school of thought do not look at the impact of institutions on individuals but rather focus on the specific interaction between them (Hall and Taylor, 1996; Scott, 2001). From the view point of new institutionalism, the main critique was that Hardin defined common property as an open access system. North (1990), Ostrom (1990) and others demonstrated that common properties are not mere open access systems without any type of organization but are more likely to be structured by formal and informal institutions. I will present here the main contributor to this school of thinking, Ostrom's common property or common pool management on how the problems of collective action is addressed in sustainable use of natural resource. Ostrom's critique to Hardin is that, common pool resource could contribute significantly to sustainable resource management. She argue that humans have created their own institutional arrangements or able to craft institutions to shape behaviour in collectively desirable ways regarding natural resources over the years. She acknowledges, however, that some of these local institutional arrangements do lead to resource degradation.

Ostrom proposed eight design principles which she called ' institutional strengthening' that can ensure the sustainable management of common pool resources. This approach is one of the most influential work of Ostrom which is widely adopted and used by international organization such as World Bank, UNDP, DIFID (Ostrom, 1990; 1992; 1995; World Bank, 1993; 2003). The basic assumption of institutional crafting as world bank suggest relies in the desirability and possibility of replacing the ineffective institutions with new ones. For example, forming water users groups, setting up water tariffs, water permits etc. For Ostrom, institutions can be crafted and applied universally for a specific goal, and successful institutions that have been able to sustain the effective management of natural resources are characterized by these eight main principles:

1. Clarity of boundaries: this deals with the definition of the boundaries of both resources and users which can be individuals or groups.
2. Correspondence between appropriation and provision of rules and local conditions: the rules have to be adapted to the local situations.
3. Participation: this is about collective choice arrangements in the sense that the participation of local people linked with the resources in the design of the rules.
4. Democracy: the existence of accountable monitoring systems.
5. Sanctions: when there is no compliance with the rules, different levels of sanctions have to exist.
6. Conflict resolution mechanism: the mechanisms set for conflict resolution have to be low cost and based on local knowledge and of easy-access.
7. Minimum recognition of rights to organize: the local rights management system have to be recognized by others level of decision making, essentially the state.
8. Nested enterprises: this states that there is a necessity to have a coherent coordination between the different layers of rights, right holders and the institutions that deal with them.

All these principles give more emphasis on institutions and structural factors. Even though Ostrom has contributed to a greater focus on informal institutional arrangements and their important role, the primary focus has been on purposeful institutions with the over optimistic assumption that institutions are designed for a specific goal (Ostrom, 1990; 1991). This assumption has resulted in a focus on the more visible, formalized institutional framework of natural resource management, such as local committees or associations. The over simplistic and optimistic nature of this approach has neglected the local embeddedness of institutions in social life and has resulted in a new shift in institutional theories towards post-institutionalism.

Post-institutionalism is a recent and emerging institutional perspective, in reaction to the common pool resources, especially in the field of natural resource management. The theory states that conventional understandings of new institutionalism do not fill the gap between theories and current realities (Cleaver, 2002; Cleaver and Franks 2005). To give concrete example here, the new institutionalism neglects, the many everyday contexts in which institutions are located and the roots they have in local history and society. In addition, new institutionalism still tends to promote a rather homogenous view of the community in which local differences, power, and politics are downplayed. Furthermore, this new institutionalism does not acknowledge the rather complex overlap of institutional domains that may result in ambiguous institutions (Cleaver, 2002; Cleaver and Franks, 2005; Wong, 2009; 2010). So the claim of post-institutionalism is to fill those gaps. The next section focuses on this post intuitionalist approach in which my framework of analysis bases.

This approach to the analysis of institutions in natural resource management in a collective action is developed and leaded by Francis Cleaver. She called it 'intuitional bricolage'. It gives much more importance to the role of agency (Cleaver, 2002, Cleaver, 2007). This approach suggests 'how mechanisms for resources management and collective action are borrowed and constructed from existing institutions, styles of thinking and sanctioned social relationships' (Cleaver, 2002: 16). This approach highlights the importance of social context such as power relations, struggles, processes of negotiation in the definition and enforcement of rules and regulations. Cleaver explicitly tackles the impact of 'institutional bricolage' on development interventions by arguing that they 'should be based on a socially informed analysis of the content and effects of institutional arrangements, rather than their form alone' (Cleaver, 2002: 11). For her proper understanding of institutions require what are the characteristics of people's agency, what constraints or enable them to behave in one way or another which includes social and economic factors, formal and

informal institutions. What is important for her is that, what can and has to be considered as appropriate institutions. This paper will argue for the adoption of this new approach to the institutional analysis of communal irrigation by claiming that an innovative analytical approach to the conceptualization and analysis of institutions in communal irrigation is through understanding processes of bricolage than conceptualizing institutions through designing or crafting. I will return to elaborate more on this concept under section 2.3.

2.2. Irrigation management and sustainable irrigation practices

Irrigation practices can be seen as relating to both irrigation use and irrigation management. But, among the common pool resources in the irrigation systems, the resource base itself is complex, as it is linked to land, to system infrastructure, and to water itself when it comes to the issue of use and management. Many institutions affect these irrigation practices; over the years, local actors have established their own institutional framework, and government and other external organizations such as World Bank have tried to regulate these practices from the outside to make them more sustainable. This is to show that institutional analysis of irrigation practices needs care and is so complex than other common pool resources. Irrigation practices are in these sense the outcomes of dealing with all the institutional influences, both formal and informal.

Irrigation practices

The use of communal irrigation and management can be purposeful and rational, or they can be routinized and taken for granted. Practices are embedded in a particular context, articulated in specific behaviour, and socially developed through people's interaction (Cleaver, 2002; Wong, 2008). In this manner, practices are bounded; related to one thing. They are related to agency as well as to institutions as they are shaped by routines, traditions and regulations. Particularly considerable attention has given to the management practices with policymakers often called 'good water governance' in order for overcoming previous shortcomings in water provision and as a tool for meeting MDGs(UN, 2005 a; UNDP, 2004; World Water Council, 2006).

Even if good governance in development policy and guidelines is often linked to a set of principles such as accountability, transparency and probity, I consider her the concept that significantly linked to the establishment of institutional arrangements for channeling the voices of water users and mediating the competing needs of different stakeholders as used by cleaver . ' There is also too little recognition of the ways in which this management systems or governance systems are adapted at community levels to produce winners in water allocation and access'(Cleaver and Hamada, 2010: 28). Some practices related to institutions of management is often narrowly focused on the service delivery without undermining the wider context that shapes the form and effects of these interventions. Some have tried to develop an analytical framework to help understand how arrangements for water management are shaped and impact on different people. The framework that is developed by Cleaver (2007) can be a good example, even if it was not specifically for irrigation governance. The framework depends on the number of key concepts of which non material resources such as institutions, social structures, and systems of rights and entitlements are of paramount important. The arrangements in which people do to get access to water are specific to their context, and these ways of organizing access to water are the 'mechanisms' of water governance. These mechanisms, as Cleaver explains, include formal and informal institutions (such as committees, collective labour groups), tariffs and fees, arrangements for queues, rotations and technology (Cleaver, 2006; Cleaver and Hamada, 2010). Irrigation practice are affected by pluriform institutional arrangements that consists of much more than just government policies or institutions directly linked to the irrigation itself (Meinzen-Dick, 2000; Yohannes, 2005; Wong, 2008; Callejo and Cossío, 2009; Cleaver and Hamada, 2010).

Sustainable irrigation practices

The concept of sustainability remains valid with its important role in discussions on natural resource management. In the last couple of decades, countries have been trying to adapt the legislative framework to stimulate sustainability. For instance, the World Bank's Sustainable Water Framework has been universally applied in many developing countries (World Bank, 1993; 2004). However, critics argue that the concept of sustainability issue remains unclear, fails to embrace the 'diversity' and 'complexity of cultural characteristics of water use and distribution, narrowly defined and ambitious (Meinzen-Dick, 2000; Wong, 2008). The Bank puts three principal concepts at the core of defining sustainable water management framework: finance, governance, and ownership. Furthermore, privatisation, improving governance by decentralisation, stakeholder participation, effective enforcement and monitoring, and appropriate technology are the five key policy prescriptions (World Bank, 1993; 2004).

If we consider ownership among the three principal concepts put forward, it requires the definition of property rights to group or individual and application. Rights in irrigation systems are complex and concepts of simple' ownership' often do not apply than what is stated. This is because of the fact that there are different bundles of rights that should be examined in irrigation systems and how they apply to rights to other resources that cannot be seen separately while dealing with irrigation. For instance, rights to land, to system of infrastructure, the water itself and other resources associated with irrigation systems. These all are indicators of the difficulties of the universal application of the Bank's Sustainable Water Framework for realization of sustainability. This has been already challenged and examined by many scientists. To mention a few among many, Strang (2004) argues that the framework ignores water as a community asset; Mehta et al.(1999) in Wong(2008) claim that the framework does not properly address political issues such as access to and distribution of water; and Cleaver and Hamada (2010) argue that the framework narrowly focus on gender-sensitive mechanisms of water delivery. It is also criticised for its inadequate understanding of human motivations, underestimating the structural factors that constrain people's participation and the complexity of institutional crafting,

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which Wong nicely coined as 'Humanising the World Bank's Sustainable Water Framework with Pro-Poor Principles of Governance'(Wong, 2008).

The motivation for sustainable irrigation management is mostly ethical and perceived as necessary, but the concept still tends to be controversial as it has many meanings and consequences. The definitions of sustainable water management seem to be divided between three approaches and principles, as World Bank states. These three fundamental principles are known as 'the Dublin principles' and is professed by the bank to govern the modern water resources management: ecological principle; institutional principle and instrument principle (World Bank, 2004). The Bank strongly relies on 'design principles' to ensure that the poor countries achieve economic efficiency, social equity in access to water and ecological sustainability simultaneously.

The focus on formalised arrangements (institutional crafting) as tools to achieve sustainability implies that formal institutions are often regarded as a major dimension of sustainability. In order to arrive at appropriate institutional design, it seems more relevant to create institutional arrangements for sustainable water use by linking local institutional arrangements with deeper understanding of the history and culture of social relations and existing cooperation. This can be done by making power more explicit in the process of institutional crafting and institutional strengthening, use of greater reflexivity and flexibility in the process of developing and implementing water governance frameworks which all starts by acknowledging institutional complexity (Wong, 2008). In addition, I want to borrow the two arguments Cleaver and Hamada (2010) assert to ensure 'good' water governance and gender equity which is paramount important in sustainable practice of irrigation management. First, the analysis of water governance needs to understand the ways in which societal resources are allocated via economic policies, legislation etc and shape mechanisms in particular ways. This is very important when it comes to the distribution of water by water users. Second, good water governance and gender equity which has an impact on sustainability need to consider how different people are able to influence the outcomes of particular governance arrangements to produce gendered outcomes for health and well being, livelihoods and for political voice.

Policies on sustainable water use should look at the wider range of social-psychological, cultural, political dimension of the concept than focusing narrowly on economic rationality. In order to make sustainable water use practicable, the complexity of institutions must be acknowledged. As Wong (2008: 19) states 'acknowledgement of social complexity is both a threat and an opportunity for water intervention, but failure to address these issues will only perpetuate the problems in existing water programmes and reforms, and the ultimate losers are the very people these programme are meant to serve'.

2.3. Institutional bricolage

As stated earlier, in order to analyse the interface between institutions and actor's irrigation practices, this paper makes use of a dynamic institutional approach called institutional bricolage. Institutional bricolage is a post-institutional approach explaining the interaction between actors and institutions focusing on the dynamics of institutional arrangements surrounding natural resource management. This approach views institutions as both constraining and enabling human agency as institutions provide boundaries that actors, in turn, reshape (Cleaver, 2002; Cleaver, 2006).

Institutional bricolage is conceived as an active process in which actors (defined as bricoleurs) piece together different institutional elements as some sort of crafting. From this, it is possible to understand that institutional components are re-used, reworked, or refashioned, redesigned to perform new functions. This ongoing transformation is important in institutional bricolage. Through time institutions change in response to the external environment and internal views (Cleaver, 2002).The approach acknowledges the hectic interaction between formal and informal institutions which has some implications for institutional influence and design (Cleaver, 2006). For instance, the actor has in principle the room for manoeuvre to reshape the different institutional influences. Bricolage is an authoritative process and some 'bricoleurs' are likely to possess more authoritative resources than others. These authoritative resources include economic wealth, specialist knowledge or official position, kinship and marriage, personal characteristics such as eloquence, strength and honesty.

She argues that institutional bricolage occurs when new bureaucratic institutions are introduced to local practices that are structured by socially embedded institutions. This paper also uses this concept of the process of institutional bricolage in challenging the school of institutional crafting for institutional development. There are three types of processes of institutional bricolage as a result of the introduction of new bureaucratic institutions, namely aggregation, alteration and articulation (see table 1). These processes hold for both the socially embedded institutions and /or bureaucratic institutions and can be more or less conscious. Processes of institutional bricolage are linked with various motivations, or logics of action. These motivations are not uniform and can vary from rational, conscious decisions to less active and more embedded explanations. Some of the decisions to reshape institutions are often linked with survival strategies or connected to necessary basic needs. In this way, the role of human agency in shaping and reshaping institutions is critical.

I will base the conceptual framework of analysis and develop my argument on Cleaver's (2002) theory of institutional bricolage and its process of articulation, alteration, and aggregation in the institutional analysis of communal irrigation in Ethiopia. The overall summary of the three process and their characteristics are presented in table l below.

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Table 1: Process of institutional bricolage and their description

Process	Description
	Stress of local institutions
Articulation	• Claims on tradition and culture • Rejection of bureaucratic institutions • Leakage of meaning
	Adaptation or reshaping of both types of institutions
Alteration	1. Alteration of socially embedded institutions: • Less conscious, more gradual • Reshaping and re-interpretation 2. Alteration of bureaucratic institutions • Conscious • Renegotiation, rule bending • Ignoring or negation of bureaucratic institutions
Aggregation	Recombination of various institutional elements • Mediation between different rules, norms and beliefs • Creation of multipurpose institutions

Source: Based on Cleaver (2002; 2006)

3. Empirical review of literature on irrigation management in Ethiopia

3.1. Brief history of irrigation development in Ethiopia

Traditional irrigation has a very old history in Ethiopia, especially in southern parts of the country, like Konso. The country's irrigation potential is estimated in the range of 1.0 to 3.5 million hectors of irrigable land, of which between 160-190 thousand ha (5-10%) is estimated to be currently irrigated. In 2002 about 352 thousand ha of land is irrigated using small-scale irrigation schemes (Gebremdhin and Peden, 2002).

The first initiative to develop irrigation was taken by the imperial government in 1950's. At the beginning of 1970's about 100 thousand ha of land was estimated to be under irrigation and many of which were controlled by foreign interests, and it was mainly to increase export earnings through production of industrial crop. After the fall of the imperial regime, all large scale irrigation schemes were nationalized by the military government and handed over to the ministry of the state farms. In all these times the importance of small-scale irrigation was marginalized. The devastating famine that occurred in 1984/85 had forced the government to adapt and implement small-scale irrigation system. After 1991, the current government took power and reversed the focus on large-scale irrigation development. Now the focus is more on the development of small-scale irrigation schemes and improvement of farmer-managed traditional schemes (Gebremdhin and Peden, 2002).

3.2. Irrigation experiences in Ethiopia

Before discussing some case studies conducted in Ethiopia, it is important to distinguish between the type of irrigation schemes. According to MoWR (2002) in IWMI (2005), irrigation schemes (in Ethiopia) are classified into three on the basis of size of land area irrigated:

1. *Large and medium scale irrigation* – Irrigation projects are identified as large-scale irrigation if the command area is greater than 3,000 hectare, medium–scale if it falls in the range of 200 to 3,000 hectare.
2. *Small scale irrigation schemes* - it includes traditional small–scale schemes up to100 hectare and modern communal schemes up to 200 hectare. There might also be especial instances, such as the traditional spate irrigation. Small-scale modern schemes can also be constructed by the Federal or Regional government. Such schemes involved dams and the diversion of streams and rivers. After construction, usually they are handed over to Water Users Associations for management, operation and maintenance with the support of personnel from

Regional Bureaus (IWMI, 2005). This paper focuses on these types of irrigation schemes for its analysis.

3. *Micro-irrigation* – This system is not understood in the same way in the different places of the country. Some consider micro irrigation in relation to the technology used, for instance, drip irrigation. Currently, the use of micro irrigation in Ethiopia is low with regard to area covered or volume of water used.

There are different studies conducted in Ethiopia to assess the irrigation management practices of users. For instance, Salilih (2007) employed both qualitative and quantitative approach, to assess the contribution of small-scale irrigation on household food security and irrigation management and problems associated with it in the Blue Nile Basin of Amhara national regional state. His findings indicate that the contribution of irrigation in improving the livelihoods of the community significantly vary from one irrigation scheme to another depending on the physical structures of the scheme, amount of irrigation water, plot size, availability of inputs, management qualities. The study also indicate that of socio-cultural and technical which resulted from lack of farmers participation from inception to completion of projects are the main constraints affecting the effectiveness of the schemes.

Checkol and Alamirew (2007) conducted a study on technical and institutional evaluation of Geray irrigation scheme in west Gojjam zone, Amhara region, Ethiopia. The scheme has been managed by Water Users Association for four years. The study shows that the overall performance of the Water Users Association in terms of managing the schemes was very poor. Even though, the study fails to conduct detail analysis on the institutional aspect, there are some indications which the study shows for the poor management of the scheme. Minimal services rendered to the beneficiaries and absence of legal authority among the water users association to enforce its by-laws are some of the indicators.

A similar study was conducted by Shimelis (2006) to evaluate the institutional and management practices of small scale irrigation systems in Ethiopia. He took the case of two small scale irrigation systems in eastern Oromiya: Gibe Lemu and Gambela Terra. Interview with key informants, Water Users Association committee members and different experts and focus group discussion were the methodology used. The result shows that the irrigation systems were poorly managed in terms of water allocation and distribution, conflict management and system maintenance, because of lack of well-established organizational and institutional conditions. Clearly defined and well-enforced land and water rights are non-existent at the operational level.

A few studies I have chosen here to show how communal irrigation management practices of the community have been practiced have certain things in common. First, most of the studies conducted lack rigorous analysis of institutions. Second, there is less understanding on the concept of institutions itself which can be seen clearly from the way the term has been used in their studies. Third, most of the studies focus on the identification of constraints affecting effective performance, of which institutions are part of the constraints affecting irrigation practices and do not extend their investigation beyond this identification to explain the underlying factors. Finally, even if there is divergent views on the concept, studies repeatedly report that dysfunctionality of /inappropriate/ institutions are the major cause for the failure of most irrigation projects.

4. Case Studies: Atsbi and Ada'a districts

4.1. Methodology

Through a literature review, illustrated with reference to examples from case studies (mainly a study conducted by Rahel, 2008), and experiences (I have worked in agricultural research institute for four years), and communications through e-mail with concerned body, this paper draws on the importance of institutional bricolage in the analysis of irrigation institutions in collective action. The methodology will be based on two main steps: description of the two selected districts and detail presentation of the institutional arrangements of irrigation schemes of both districts.

4.2. General background

The two districts selected for the case studies are Atsbi Wemberta district in Tigray region and Ada'a district in Oromia region, Ethiopia. Atsbi district is located about 860km north of Addis Ababa. The district is geographically located 13037'N latitude and 39030'E longitude. There are 16 administrative localities in the district. The recent district population report estimated that there are 21,398 households with a total population of 110,578 in 2003/04 (Atsbi Wemberta District Pilot learning site diagnosis, 2005). Ada'a district is located about 47 km southeast of the capital Addis Ababa, geographically located 8030' N latitude and 39017' E longitude. There are 27 peasant associations and 9 town dwellers associations with a total population of 138,147. There are a number of rivers and natural lakes that are being used for irrigated agriculture (Rahel, 2008).

The choice of such kind of communities is useful in analysis of institutions as there are a considerable number of WUA, WUC, focus areas of government in poverty reduction and the schemes are mainly organized and managed by farmers. Irrigation at both districts are aimed at improving productivity, achieving food self sufficiency and sustainable development based on a strategy called Agricultural Development-Led Industrialization (ADLI). During the study period (2008), 14 and 8 irrigation projects were operating in Atsbi and Ada'a, respectively. In the same period there were 94 and 75 of water users association in Atsbi and Ada'a respectively.

4.3. Institutional Arrangements

In the next section, I will focus on the institutional arrangement of the water utilization mechanisms among the WUA in the two study districts, after presenting the general framework of irrigation schemes at national level. I will prefer here to present some of the selected important issues from the detailed study conducted, that will help to address the objective of the paper. The main source of information

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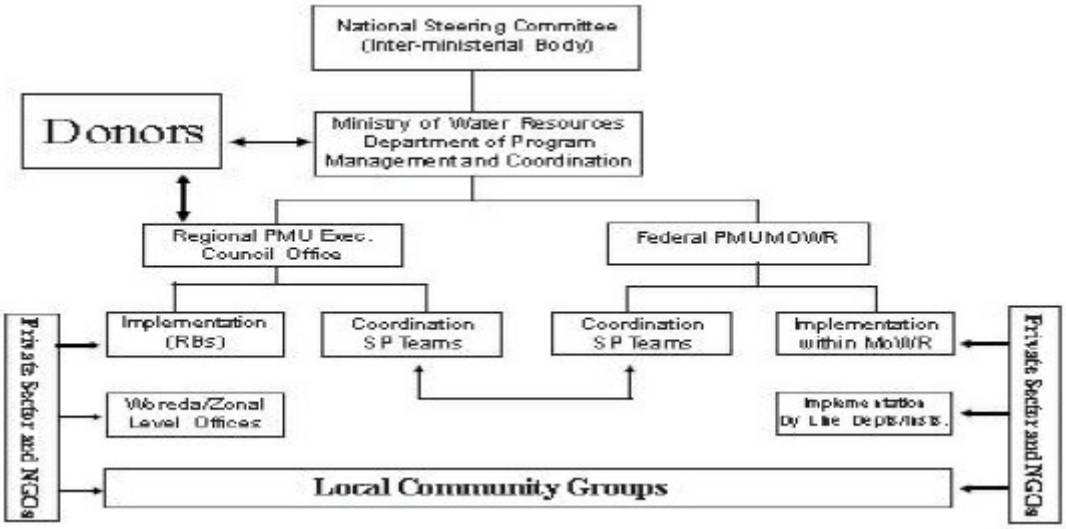
presented below is extracted from Rahel (2008) unless source is indicated.

The general organizational framework of irrigation section in Ethiopia is presented in the diagram below.

Figure 1: program management arrangements



Source: WSDP, 2003: p.128

Water resources management policy and water sector strategy document 'Water Sector Development Programme' of the Ministry of Water Resources (MoWR) of Ethiopia, identifies five partners with their roles for the country to commit itself to the achievement of the MDGs agreed on by the international community. These are government institutions, private sector, local communities and individuals, NGOs, and external support agencies, figure 1. Their roles and functions of these partners are summarized in table 2.

Table 2: roles and functions of partners

Role of government institutions (both federal and regional)	Role of Private sector	Role of Local communities and individuals	Role of NGOs	Role of external support agencies
o Take the lead responsibility o Make high profile decisions o Reviewing sectoral policies and large investment projects o Improve the systems for inter-institutional collaboration and enhancing capacities for departments o serve as an important link between the	o Improve the production of key inputs and bring new investments in to the sector	o Invest capital and labour o Improve their resource management practices o Responsible for managing common resources, improving their own organizational setup, undertaking and maintaining projects o Increasing the	o Project identification, implementation, financing o Promote integrated rural development o Bringing additional financial resources o Strengthening technical	o Provide financial resource and technical assistances

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perceptions of the communities at the local level and the leadership role ○ Create incentives to create private participation ○ Financial support for maintenance at outlet and system level.		involvement of women ○ Participate as project or program initiators, implementers, or owners as well as operators of community schemes ○ Expanding the scope and functions of WUAs beyond the irrigation subsector to improve governance of the whole implementation of the WSDP.	capacities of regional bureaus ○ Organizing local communities ○ Undertaking rehabilitation works	

Source: Water Sector Development Program (WSDP) of MoWR, 2003

Management Systems at Community level

Each irrigation scheme is a common property owned and managed by the community. Each site has formed Water Users Association (WUA) which is administered by Water Users Committee (WUC). Everybody who is the beneficiary of irrigation water is a member of WUA in a particular scheme. WUA is a local institution (formal) and has a basic character of authority and by-laws. It has rules, methods and sanctions for selecting executive committee, raising finances, setting disputes among irrigation water beneficiaries and supervising provision of the irrigation water service. Each irrigation site has an elected committee with 3-7 members, which varies from scheme to scheme; with one-chair person, one-vice chairperson, one secretary, one treasurer (cashier), controller(s) and remaining as members. It also embraces a water distributor who is responsible for everyday operation of the scheme.

The executive committee serves as an official link between WUA (users) and the government officials at Pas and Districts and represent irrigation land owners not government. They are elected by water users and don't have formal office, payment or compensation for their services. There are different criteria that users consider for the selection of their committee. Ownership of land within the same catchment's area, active participation within the community, age and good family background such as wealth, discipline, etc(authoritative resources). Such kind of locally set criteria have an impact on institutional set-up, which I will discuss later.

Overall, the following are some of the principal duties of executive committees and water distributor:

- Enforcing the rules and regulations set of the association;
- Collect annual cash contributed from each water user;
- Planning and mobilize resources for operation and maintenance of the schemes;
- Assisting government office by supplying information;
- Resolving conflict related to water distribution;
- Negotiating with water users, they decide the water schedule and the mechanisms how to distribute it.

Nature of Collective Action

Users have general assembly before the start of the irrigation season. The objective of the meeting is to negotiate when to clean the canals, decide the schedule of water distribution, rotational irrigation intervals, for how much time to irrigate per user.etc. The main facilitators on such kind of assembly are water distributors. The rule and regulations of WUA in both districts dictate that members should meet once a month and WUC once at fortnight to discuss problems make decisions and once a year to elect new executive committee and water distribution. The practice, however, is far from what has been written and documented. They meet when they need to negotiate on the issues of maintenance, distribution of water and when there is urgent action required. Their rules also state that all farmers are allowed to participate equally

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in all meetings which are led by WUC and have equal right to vote and to be elected to serve as committee, water distributor or block leader. This is also far from reality when it comes to the participation and representation of women which will be discussed under gender dimension. Double representation is considered as inefficient and unnecessary among users.

As far as contribution is concerned, the study identified three kinds of contributions among irrigation beneficiaries: in cash, kind and labour. Of the three kinds, labour is the most common contribution made by members to clean and maintain the canals collectively in a number of times a year. The amount of contribution is different among the districts and groups. Failure to participate in the activities will result in punishment by cash fine set by the WUA. In both districts the canal water charge is zero. They collect money to cover operation and maintenance costs and payment for guards and water distributor. In kind contribution includes cereals which would be used for the payment of the guard. Other contributions in kind from beneficiaries which they use for minor construction include stone and soil. Income collected from punishment is also used for minor construction. There were conflicts in contributing labour between the tail and head enders.

Water Rights

Ethiopia does not have any explicit legal framework for irrigation use water rights. Individual rights to irrigation water depends on the owning of land near the scheme. Any farmer who has land near the irrigation water can have a right to use the irrigation water. Thus, water use right is recognized only indirectly through land rights.

Legal Framework

One of the most important and interesting aspect of this study is the close link and interdependence of formal and informal institutions. Customs and conventions have been highly used and practiced among communities for water sharing and management. The informal customs and conventions are still very valuable insights for the communities in designing institutional mechanisms that are needed for filling the organizational vacuum existing at grassroots level of water management. I will discuss this issue in the next section.

The rules and regulations for operation and water management were formulated by the users in collaboration with the distinct agricultural offices. What is funny with these written arrangements is that, it is documented only at the district agricultural offices and neither water users nor WUC have the written document of the rules. They run the operation simply as a commonly understood convention and recall punishment rates as they want. In Atsbi rules and regulations have been revised many times, since the beginning of the establishment of the association. Here comes the controversy of the universal application of design principles philosophy and whether local institutions are amenable to design, the scope for negotiating the norms that underlie institutional arrangements (Cleaver, 2002). I will use this point later to argue how and why the process of bricolage is more relevant in designing appropriate institutions for the sustainable use of natural resource management in a collective action. Unlike in Atsbi, written rules and regulations in Ada'a is a bit different and detailed the rights and obligations of members, committees, and other partners. In this district also compliance to the written arrangements found to be hardly possible. The level of obedience to the WUAs by-laws is low. The by-laws were never revised and raised for renegotiation. The most frequent violation of the rules reported is stealing of water, infrastructure damage by livestock of the non members, not attending and being late in meetings. For example, mean number of times for violation of rules and regulations per group per year was about 13 and 26 in Atsbi and Ada'a, respectively. Similarly, the mean number of times conflict occurred one cropping season due to water use related was 19 times in Ada'a and 10 times in Atsbi. The less occurrence of conflict and violation of rules in Atsbi might be due to the frequent negotiation and revision of rules at different times to fit to local conditions. Such kind of situations is best explained through the concept of bricolage.

Conflict Resolution Mechanisms: mixing tradition and modern arrangements

Interaction of formal and informal institutions (mixing tradition and modern arrangements) in conflict resolution at local level were common in both districts. This mixing of tradition and modern arrangements in conflict resolution mechanisms took place in four different ways at four levels:

- One to one negotiation between victims: both parties come together and negotiate and agree on resolving the conflict with the facilitating role of local elders;
- At block or group level: this kind of negotiation is a semi-formal where the block or group leaders elected among water users participate in the conflict resolution process.
- Scheme level: in this case water distributor and the executive committee will involve in conflict resolution when the above two proposed methods have failed.
- Local administration and community court: this is a method of conflict resolution where the WUC refers conflict management cases beyond their capacity to the local administration and community court. The court (formal law) is responsible for managing higher level conflict over water use in the community which the previous three fail to addresses. However, this type of system for conflict resolution was found to be less preferable among users and executive committees for it's the bureaucratic/procedural requirement and routine activities involved in deliberating and delivering solutions which takes time and resource.

Gender dimension

There is consensus among scholars that the meaningful involvement of women in water resources development and management can help make projects more sustainable and effective (World Bank, 2004; Delgado and Zwarteven, 2007; Wong, 2009; Cleaver and Hamada, 2010). However, the road to get there is not a simple task as widely reported in

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literature. In this particular intervention as well; the need for the participation of women at three different levels: farm level, association (forum) level and leadership level in WUAs is explicitly stated both in government agenda and rules and regulations crafted among WUA. All farm decision markers in a WUA have an obligation to participate at association level. However, if the economic status and family labour constraint of female headed households is realized by other members of WUA, they will be excused for not participating in maintenance and clearance of canals.

Despite such arrangements the participation of women remains low and large proportion of female headed households quit practicing irrigation due to 3 major reasons. The first one is related to the triple role of women-productive, reproductive and community works. The second is financial problem - most of them are categorized in low-income level group of the society, as a result, they cannot use complementary inputs like fertilizer, variety of seed etc. The by-laws obligated members to use these inputs. The third is related to water use schedule: during water shortage season, members are only allowed to use the irrigation water only at night which involves security threats /concerns. Institutional arrangements do not recognise the real situation of women and led women to lag behind triggering gender and economic inequality. Unless gender sensitivity is combined with social analysis, community management of water supplies is not automatically inclusive and equality enhancing (Cleaver, 2002; Jyotishi and Rout, 2005; Wong, 2008). Plots are allocated to a household as a unit, with men (husbands) being the representative of the household, with the assumption that women would benefit through their husbands. Men's dominant role in economic transactions, representation and legal matters and their contribution to family income is extended to the responsibility to participate in decision making bodies, such as WUAs and their meetings. Let's turn to discuss what these case studies mean in designing appropriate institutions and how the process of bricolage is taking place.

4.4. Critical reflections about the intervention

There are two important aspects to discuss here. The fist aspect to discuss here is that the intervention made at both sites seems to use the approach of common pool natural resource management that employs the Ostrom's design principles(1995), strongly relying on idea that appropriate mechanisms can be designed to ensure optimum resource use, beneficial collective action and hence to build social capital. The second important aspect is that the case studies confirm several issues highlighted in the theoretical framework. Let's discuss them.

The blindly application of sanctions as Ostrom 'design principles' suggest for effective collective action is questioned and subjected to critics. One of the main criticisms is that new formal regulations often do not link up with the socio-cultural dynamics at the local level (Long, 2001; Yohannes, 2004; Mosse, 2005). Often, the approach focus solely on designing formal institutions for irrigation practices without taking into account that informal and non-irrigation institutions may just as well be important for irrigation practices. As stated in the case studies there are cases in which the communities articulate, alterate or aggregate the crafted arrangements. This is an indication of the fact that the process of bricolage is the best conceptual approach that can explain how institutions function and designed in a common pool resource such as irrigation. The crafting of institutions need to understand and acknowledge the complex systems embedded in the society. For example, credit institutions, land policy; socio-cultural contexts could determine the effective use of irrigation. Women members were constrained by these factors and forced to quit the WUA. Formal institutions may reproduce existing patterns of inequity and may serve to shape and reinforce other differences (Mair and Marti, 2009). Where the social capital is strong, the transaction cost was found to be low such as hiring less number of guards. This confirms that fact that institutions, when designed and functioning properly, are able to reduce the transaction cost of natural resource management (North, 1990; Ostrom, 2006).

The processes of institutional bricolage described in this paper involve the most important irrigation practices in each case. An important aspect in the definition of actors as bricoleurs is the possession of authoritative resources. For each irrigation practices, there is a different identified process of institutional bricolage. For instance, the level of participation of bricoleurs depends directly on their authoritative resources. Authoritative resources are attributes that justify institutional position or influence (Reddy and Reddy, 2005). For instance, the criteria set to be elected as an executive committee can be a good example of how participation of bricoleurs in decision making process is liked with the resource (asset), status and linkages they have. Some such resources are linked to an actor's socio-political position, for example, an official position, wealth, formal function, or a social network. The more authoritative resources an actor possesses, the more he is able to call on these attributes and reshape institutions. If an actor has a large number of authoritative resources, he can become a local change agent and will consequently have the capacity to influence the whole community. This makes bricolage an authoritative process in which the people with fewer authoritative resources are less likely to be bricoleurs and less likely to play an important role in processes of institutional bricolage. This process has contributed the poorest of the poor women to lag behind (Bastiaensen, 2005; Mair and Marti, 2009; Wong, 2008; Wong, 2010).

The processes described in the case studies where norms and rules are continuously shaped by different social actors based on social and power relationships, both inside and between WUA, WUC and office of agriculture confirm the existence of institutional bricolage. The norms and rules in Atsbi were continuously changed and shaped by different social actors where as the norms and rules in Ada'a were not revised. This is a confirmation that institutional 'bricolage is an active and conscious process of reshaping institutions, whereas in other cases it contains more unconscious elements as some institutions are deeply embedded (see table 1). This challenged the universal effective application of the 'design principles' which the World Bank preaches.

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The negotiation of rules and regulations (alteration) usually take place between users, and with government office of agriculture and sometimes outside of the rules and regulations. Norms and practices and relationships of trust and cooperation which underlie them, are often generated and negotiated outside the formal institutions. This shows that institutional bricolage takes place in a wider arena than that defined by the visible structures of bureaucratic resource management institutions professed by institutional crafting/design. The participation of external organizations such as NGOs may also undermine the process of bricolage or may be important for sustaining the institutions by providing technical to capacity building to users (Edmonds, 2003). Thus, the design principles may not explain well the realities and are usually ill-designed without the deeper understanding of the socially embedded norms, rules and beliefs. Hence, the best way to understand this complex institutional set up is through the concept of bricolage.

Evidence shows that bureaucratic institutions are unlikely to have evolved through a process of institutional bricolage (articulation) and may be perceived by local people as costly, lacking in legitimacy and cumbersome. Such new institutions are subjected to a process of evolution that over time process of bricolage will ensure their redundancy or their adaptation to create more socially embedded arrangements. This can easily be understood with the reliance and preference of communities in conflict resolution on the traditional arrangements. As stated earlier the communities prefer the informal arrangement in process of conflict resolution as it is less costly, less bureaucratic and considered it more legitimate than the one based on 'you lose, I win; you win I lose' principles. Thus, the concept of institutional bricolage allows us to reflect the diverse location of the generation of institutional arrangements (Cleaver, 2002)

The exclusions of communities who actually own the resource from using it is another threat to the sustainable development of institutions. This has an impact on equity and poverty reduction strategies that target the poor as well as it perpetuate poverty and inequality. For instance, in Atsb at one of the scheme, it has been nine years since farmers have not used the irrigation because of the conflict that has occurred between the displaced grazing land owners who are not compensated for the loss of their land for dam construction and the current irrigation water users. The intra-boundary locations of projects also cause a continuous conflict among communities. Such kind of conflict causes instability and use conflict as it is also happening in Ada'a district. The dam was constructed in-between the beneficiary district and the excluded neighbour district. The presence of such conflict is also creating additional cost for the operation of the irrigation which the beneficiaries should share. For instance, in Atsbi and Ada'a districts four and three guards are hired to protect the dam and its whole structure from any external attack such as attack from the displaced people, respectively. Building of appropriate institutions to ensure optimum resource use need proper consultation of the communities whom the project affect and well informed analysis of the content and effects of intuitional arrangements(William, 2001; Yohannes, 2005; Reddy, 2005).

To further elaborate the importance of institutional bricolage as analytical elements to understand the institutional dynamics and complexities of irrigation development, I want to bring here the three streams of criticism developed by Cleaver and Frank (2005) as regards to the conventional 'deign principles' promoted by the common property resource management approach. The first one is **the narrow functionalism of institutions:** the trend to consider people as a function of the institution and resource to be managed, in this case irrigators, and the outcomes produced in terms of more effective resource management leading to partial understanding of their motivations for collective action, and also simplistic assumptions about the relationships between rules and decision making structures within institutions. The second one is the **simplistic evolutionism of institutions**. Institutional theory assumes an almost linear path which institutions should follow (Ostrom, 2000). However, the case studies presented earlier confirm that there is no linear path and it is difficult to predict exactly how newly introduced arrangements will become revised, adapted and socially embedded over time, or abandoned and forgotten, through process of institutional bricolage. The final one is related to the understanding of **social complexity**. The case studies re-affirm that there is no consistent existence of clear boundaries within communities and resources. Natural resources are beyond commodities and are invested with social and symbolic meaning to people (Cleaver, 2000) whose decisions about them can differ from external perceptions of efficiency and optimization.

Gender sensitivity need to be combined with social analysis, community management of water supplies is not automatically inclusive and equality enhancing. There was recognition that women should play an increased role in water management, and a requirement that water point committees should primarily consist of women (World Bank, 2003; IWMI, 2005; Wong, 2008). However, poor women were less likely to be elected to positions on WUC or group leader. When asked the criteria used to elect people to positions of responsibility users repeatedly mentioned two qualifications: someone they could respect and someone with authoritative resources such as cash, linkage, wealth, etc. However, the stereotype developed in the communities do not favour them and poor women generally have less access to water supplies and greater constraints on time and labour resources than other women or men. For those who were able to overcome these factors and able to secure positions, their performance and efficiency was higher than the men counterparts. Actors have embedded understandings of a certain way of doing things that are linked not only with ethical norms, such as the appropriate way, but also with beliefs or traditions. These norms and beliefs influence irrigation practices to the same extent as rational survival strategies or actions based on expedience (Cleaver 2000, 2002).

In sum, the following interrelated factors affect the institutional sustainability of communal irrigation: miss understanding of the complexity of institutional arrangements, scarcity of resources (water); ecological stress; geographic location of the resource within communities-exclusion of others, tension between tail and head end users; socio-cultural contexts; power relations;

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gender; access to other institutions such as inputs markets, output markets, types of land and land rights.

5. Conclusions and Policy Implications

The government still have great confidence in the functioning of transparent formal institutional arrangements as a means to protect and ensure sustainable utilization of irrigation. This trust, however, does not seem to correspond with reality as people's choices about whether or not to comply with laws are based on many factors that never seem to be related in a visible and simple linear fashion (Poteete and Ostrom 2002).

Different levels to analyze institutions are discussed, particularly from institutional bricolage perspective by identifying key knowledge gaps and the need to integrate some of the elements found in the different approaches. Common pool resources management highlights the role of local organizations and institutions with respect to collective water management, and the possibilities to design "robust institutions" considering the involvement of different stakeholders, not only (state) authorities. A post-institutional approach focuses on the dynamics of social behaviour and the way in which institutions are constantly shaped and re-adapted by collective action (Cleaver and Franks, 2005). The post-institutional approach looks at institutions neither as static nor as "robust" structures within which human behaviour is supposed to be defined. It conceive institutions as a "bricolage" of different rules, social and power relations shaped by continuous collective action resulting in a diversity of arrangements at different levels. Therefore, key issues for appropriate development interventions aimed at institution building should consider: historical factors, power relations, gender, and world views (cultural repertoires). Under such condition, I have argued that the concept of institutional bricolage is an analytical approach to understand the dynamics and complexities of irrigation development.

As Cleaver and Franks (2005) argue literature tends to 'emphasize the formalization of institutional arrangements, the codification of rules and regulations, the specification of clear authority structures, and the strict exercise of sanctions against 'free riders'. I have presented thoroughly the limitations of these universal application of the 'design principles' approach failing to explain the realities underlying the institutional formation of communal irrigation where collective action is more are complex. In this context 'institutional bricolage' are important elements when water institutions need to be analyzed regardless of the institutional setting of any one country. Two things are important in the use of the concept of institutional bricolage: flexibility and uncertainty. Power relations, class and gender issues, or inter-sector relationships influence the application of norms, making them negotiable given the specific context existing at that moment.

There are common elements that have been raised among different schools of thought. A common element is the way in which institutions are conceived, not only as a state or formal structure, but mainly as rules that govern people's interactions. It is necessary to emphasize that institutional analysis under different approaches coincides with the general elements used: institutional structure and administration, local arrangements and practices, norms and legal framework, and policies. The differences among the approaches are the specific elements that are used to analyze institutional dynamics and their practical implications: some consider the structure and the need to formalize rules under state law and administration as being more important and others recognize the role of collective action as the driving force that shapes institutional functioning.

Thus, in the face of growing demands of irrigation water with declining water resources, the concept of institutional bricolage is the better analytical approach to understand the dynamics and complexities of irrigation development in diverse socio-ecological settings such as communal irrigation hence build appropriate institutions that can fit the needs of the poor. This can only be addressed through the process of institutional bricolage. The case studies confirm the need for this diagnostic approach. I want to conclude with what cleaver (2002: 29) asserts in understanding of the dynamics of institutional bricolage, 'we cannot predict exactly how newly introduced arrangements will become revised, adapted and socially embedded over time, or abandoned and forgotten, through process of institutional bricolage'. Thus, development interventions which recognise the importance of the processes of (institutional) bricolage have great potential of success and ensure sustainable use of natural resource.

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